

Report Information
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Interframe DPCM with robust median-based predictors for transmission of image sequences over noisy channels.

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Full text options **USPTO Full Text Retrieval Options**

Accession number & update

0005210118 20070101.

Source

IEEE Transactions on Image Processing, (IEEE-Trans-Image-Process-USA), Jan. 1996, vol. 5, no. 1, p. 16-25, 25 refs, CODEN: IIPRE4, ISSN: 1057-7149. Publisher: IEEE, USA.

Author(s)

Song-X, Viero-T, Neuvo-Y.

Author affiliation

Song, X., Signal Process. Lab., Tampere Univ. of Technol., Finland.

Abstract

A new image sequence coding technique based on robust median-based predictors is presented for the transmission of image sequences over noisy channels. We analyze the robustness of median-based predictors against channel errors. A heuristic algorithm for the design of a robust predictor from a given median-based predictor is presented. It is shown that with small modifications in terms of a necessary requirement for a median-based predictor to be robust against channel errors, the robustness of a given median-based predictor can be considerably improved. Simulations on a real image sequence show significant improvement over the conventional differential pulse code modulation (DPCM) at high bit error rate (BER) using this new technique. The technique does not increase the transmission rate. It is shown that the quality of reconstructed images obtained by robust median-based predictors can be further improved by postprocessing the image using a nonlinear detail-preserving **noise**-smoothing filter.

Descriptors

DIFFERENTIAL-PULSE-CODE-MODULATION; FIR-FILTERS; IMAGE-CODING; IMAGE-RECONSTRUCTION; IMAGE-SEQUENCES; MEDIAN-FILTERS; NONLINEAR-FILTERS; PREDICTION-THEORY; SMOOTHING-METHODS; TELECOMMUNICATION-CHANNELS; VISUAL-COMMUNICATION.

Classification codes

B6140C Optical-information-image-and-video-signal-processing*;
B6120B Codes;
C1250 Pattern-recognition*.

Keywords

interframe-DPCM; robust-median-based-predictors; channel-errors; noisy-channels; image-transmission; image-sequence-coding; heuristic-algorithm; simulations; differential-pulse-code-modulation; high-bit-error-rate; BER; transmission-rate; reconstructed-images-quality; postprocessing; nonlinear-detail-preserving-filter; **nonlinear**-noise-smoothing-filter; FIR-median-filters.

Treatment codes

T Theoretical-or-mathematical;
X Experimental.

Language

English.

Publication type

Journal-paper.

Availability

SICI: 1057-7149(199601)5:1L;16:IDWR; 1-9.
CCCC: 1057-7149/96/\$05.00.
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Digital object identifier

10.1109/83.481667.

Publication year

1996.

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Edition

1996010.

Copyright statement

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Comments on 'A subjective evaluation of noise-shaping quantization for adaptive intra-/interframe DPCM coding of color television signals' (by B. Girod et al.).

Dialog eLinks

Full text options [USPTO Full Text Retrieval Options](#)

Accession number & update

0004041262 20070101.

Source

IEEE Transactions on Communications, {IEEE-Trans-Commun-USA}, Aug. 1991, vol. 39, no. 8, p. 1192, 1 refs, CODEN: IECMBT, ISSN: 0090-6778, USA.

Author(s)

De-Lameillieure-J, Bruyland-I.

Author affiliation

De Lameillieure, J., Bruyland, I., Lab. for Commun. Eng. & Inf. Transmission, State Univ. of Gent, Belgium.

Abstract

In the above named work by B. Girod et al. (see *ibid.*, vol.36, no.3, p.332-46, 1988), a stability condition for a DPCM (differential pulse code modulation) system with additional quantization error **noise** shaping has been proposed. In the present work, a correction of this stability condition is derived.

Descriptors

ENCODING; **NOISE**; PULSE-CODE-MODULATION; STABILITY-CRITERIA; VIDEO-SIGNALS.

Classification codes

B6120 Modulation-and-coding-methods*.

Keywords

adaptive-intraframe-coding; **interframe**-coding; **DPCM**-coding; color-television-signals; differential-pulse-code-modulation; quantization-error-noise-shaping; stability-condition.

Treatment codes

T Theoretical-or-mathematical.

Language

English.

Publication type

Journal-paper.

Availability

CCCC: 0090-6778/91/0800-1192\$01.00.

Digital object identifier

10.1109/26.134007.

Publication year

1991.

Publication date

19910800.

Edition

1992003.

Copyright statement

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Background separation/filtering for videophone applications.

Accession number & update

0003875713 20070101.

Conference information

ICASSP 90. 1990 International Conference on Acoustics, Speech and Signal Processing (Cat. No.90CH2847-2), Albuquerque, NM, USA, 3-6 April 1990.
Sponsor(s): IEEE.

Source

ICASSP 90. 1990 International Conference on Acoustics, Speech and Signal Processing (Cat. No.90CH2847-2), 1990, p. 1981-4 vol.4, 5 refs, pp. 5 vol. 2970. Publisher: IEEE, New York, NY, USA.

Author(s)

Harasaki-H, Yano-M, Nishitani-T.

Author affiliation

Harasaki, H., Yano, M., Nishitani, T., NEC Corp., Kawasaki, Japan.

Abstract

To increase efficiency on **interframe** coding and/or to preserve speaker privacy for videophone applications, a method for real-time background separation based on stereoscopic range finding is developed. The algorithm includes foreground center extraction, foreground **threshold** calculation, occlusion-free direct block matching with quadtree block subdivision, and contour segmentation using a motion edge. The algorithm is evaluated using a stereo-video sequence. For an application using the background separation technique, background filtering is introduced. Background filtering can decrease the number of inessential coded blocks, when applied to a motion-compensated hybrid differential pulse-code modulation (**DPCM**)/transform coder. If the cut-off frequency for filtering characteristics is further lowered, the filtering will conceal details in the background.

Descriptors

ENCODING; PICTURE-PROCESSING; REAL-TIME-SYSTEMS; VIDEOTELEPHONY.

Classification codes

B6430 Television-equipment-systems-and-applications*;
B6120B Codes;
B6140C Optical-information-image-and-video-signal-processing;
B6210D Telephony.

Keywords

videophone-applications; real-time-background-separation;
stereoscopic-range-finding; foreground-center-extraction; foreground-**threshold**-calculation; occlusion-free-direct-block-matching; quadtree-block-subdivision; contour-segmentation; motion-edge; stereo-video-sequence; background-filtering.

Treatment codes

P Practical;
T Theoretical-or-mathematical.

Language

English.

Publication type

Conference-paper.

Availability

CCCC: CH2847-2/90/0000-1981\$01.00.

Digital object identifier
10.1109/ICASSP.1990.115901.
Publication year
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Publication date
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Edition
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Redundancy and irrelevancy reduction of TV-signals by interframe DPCM- coding.

Accession number & update
0002933693 20070101.

Conference information
Signal Processing III: Theories and Applications. Proceedings of EUSIPCO-86: Third European Signal Processing Conference, The Hague, Netherlands, 2-5 Sept. 1986.

Source
Signal Processing III: Theories and Applications. Proceedings of EUSIPCO-86: Third European Signal Processing Conference, 1986, p. 817-20 vol.2, 4 refs, pp. 2 vol. xxvi+1436, ISBN: 0-444-70085-4. Publisher: North-Holland, Amsterdam, Netherlands.

Author(s)
Arp-F., Editor(s): Young-I-T, Duin-R-P-W, Biemond-J, Gerbrands-J-J.

Author affiliation
Arp, F., Dept. of Electr. Eng., Wuppertal Univ., West Germany.

Abstract
Deals with the description of an **interframe DPCM**-coder which is implemented according to earlier considerations. The experimental redundancy reduction fits the theoretically derived values only if the predictor is switched by a movement detector. The picture contents may be assumed to be generated by a composite source of differently stationary signals describing the unmoved background and the moving parts, respectively. The results show also that **noise** is a serious reason for failing in achieving desirable rates of redundancy reduction. An attempt is made for eliminating irrelevant structures of the picture contents by simulating visual properties of perception within the coding procedure. The relevancy of each differential signal value is determined on the basis of a nonlinear filtering procedure which is applied to the picture content. In this way the equispaced quantizing levels of the **DPCM**-coder are dynamically expanded. The result is a probability distribution with an increased non-uniformity and thus a reduced entropy of the differential signal.

Descriptors
ENCODING; PULSE-CODE-MODULATION; REDUNDANCY; VIDEO-SIGNALS.

Classification codes
B6120B Codes*;
B6140 Signal-processing-and-detection.

Keywords
irrelevancy-reduction; TV-signals; **interframe**-DPCM-coding; redundancy;
movement-detector; composite-source; unmoved-background; **noise**;
visual-properties; differential-signal-value; equispaced-quantizing-
levels; probability-distribution; entropy.

Treatment codes
T Theoretical-or-mathematical.

Language
English.

Publication type
Conference–paper.
Publication year
1986.
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Edition
1987016.
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Copyright 1987 IEE.

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An adaptive three–dimensional predictor for DPCM coding of studio television signals.

Accession number & update
0002049711 20070101.

Conference information
International Conference on Electronic Image Processing, York, UK,
26–28 July 1982.

Source
International Conference on Electronic Image Processing, 1982, p. 184–7, 3 refs, pp. viii+253. Publisher: IEE, London, UK.

Author(s)
Westerkamp–D.

Author affiliation
Westerkamp, D., Univ. Hannover, Hannover, West Germany.

Abstract
A new adaptive prediction scheme is proposed for **DPCM**–coding of broadcast television signals with fixed length codewords. The adaptation of the prediction algorithm to the intra– or **interframe** type is done by the comparison of two activity functions. Only previously transmitted picture elements are used for the calculation of these activity functions, so no additional switching information has to be transmitted. To reduce the **noise** sensitivity of the decision algorithm a hysteresis is implemented. The performance of the proposed adaptive prediction scheme is compared to know fixed predictors by means of computer simulations and subjective tests using TV sequences.

Descriptors
ENCODING; PULSE–CODE–MODULATION; VIDEO–SIGNALS.

Classification codes
B6120B Codes*;
B6430 Television–equipment–systems–and–applications.

Keywords
adaptive–three–dimensional–predictor; **DPCM**–coding; studio–television–signals; adaptive–prediction–scheme; broadcast–television–signals; fixed–length–codewords; activity–functions; hysteresis; computer–simulations; subjective–tests.

Treatment codes
P Practical;
T Theoretical–or–mathematical.

Language
English.

Publication type
Conference–paper.

Publication year
1982.

Publication date

19820000.

Edition

1983006.

Copyright statement

Copyright 1983 IEEE.

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Hybrid DFT/DPCM interframe image quantization.

Accession number & update

0001736337 20070101.

Conference information

ICASSP 81. Proceedings of the 1981 IEEE International Conference on Acoustics, Speech and Signal Processing, Atlanta, GA, USA, 30 March–1 April 1981.
Sponsor(s): IEEE.

Source

ICASSP 81. Proceedings of the 1981 IEEE International Conference on Acoustics, Speech and Signal Processing, 1981, p. 1121–4 vol.3, 5 refs, pp. 3 vol. 1291. Publisher: IEEE, New York, NY, USA.

Author(s)

Pearlman–W–A, Jakatdar–P.

Author affiliation

Pearlman, W.A., Jakatdar, P., Electrical, Computer & Systems Engng. Dept., Rensselaer Polytech. Inst., Troy, NY, USA.

Abstract

A non–adaptive scheme for encoding an image sequence is claimed to yield better results than any previous comparable **interframe** image coding method. The scheme uses a hybrid of two–dimensional transform coding for the spatial dimension and **DPCM** for the time dimension. Unlike previous efforts, which use discrete cosine transforms (DCT's) of image subblocks and suboptimal quantization, this utilizes a full image DFT and an optimal quantization algorithm. The results with the standard sixteen frame sequence of Walter Cronkite are visually superior to previous transform coding efforts, especially at rates lower than 1 bit/pixel/frame. The **signal-to-noise** ratios are higher than those of nonadaptive hybrid **DCT/DPCM** by 2.6 to 10.5 dB depending on rate.

Descriptors

FOURIER–TRANSFORMS; PICTURE–PROCESSING; PULSE–CODE–MODULATION.

Classification codes

B6140C Optical–information–image–and–video–signal–processing*;
C1250 Pattern–recognition*.

Keywords

interframe–image–quantization; two–dimensional–transform–coding; **DPCM**;
full–image–DFT; S/N–ratios.

Treatment codes

T Theoretical–or–mathematical.

Language

English.

Publication type

Conference–paper.

Publication year

1981.

Publication date

19810000.

Edition

1981010.

Copyright statement

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Quantiser selection for interframe differential pulse code modulation of television pictures.**Dialog eLinks**Full text options **USPTO Full Text Retrieval Options****Accession number & update**

0001358755 20070101.

Source

Electronics Letters, {Electron-Lett-UK}, 1 March 1979, vol. 15, no. 5, p. 142-4, 7 refs, CODEN: ELLEAK, ISSN: 0013-5194, UK.

Author(s)

Dennis-T-J.

Author affiliation

Dennis, T.J., Dept. of Electrical Engng. Sci., Univ. of Essex, Colchester, UK.

Abstract

A procedure based on subjective and objective assessments has been used to design an 8-level quantiser for an **interframe** d.p.c.m. digital television coding system handling monochrome 5.5 MHz 625 line pictures. The quantiser reduces **noise** in a static picture over its 8-bit source and attempts to minimise the distortion of movement.

Descriptors

ENCODING; PULSE-CODE-MODULATION; VIDEO-SIGNALS.

Classification codes

B6120B Codes*;

B6430 Television-equipment-systems-and-applications.

Keywords

interframe-differential-pulse-code-modulation; objective-assessments;
8-level-quantiser; digital-television-coding-system; monochrome-5.5-
MHz-625-line-pictures; **DPCM**; subjective-assessments; monochrome-TV;
noise-reduction; movement-distortion-minimisation.

Treatment codes

X Experimental.

Language

English.

Publication type

Journal-paper.

Publication year

1979.

Publication date

19790301.

Edition

1979006.

Copyright statement

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Combined spatial and temporal coding of digital image sequences.

Accession number & update

0000945856 20070101.

Conference information

Proceedings of the Society of Photo-Optical Instrumentation Engineers, vol.66. Efficient Transmission of Pictorial Information, San Diego, CA, USA, 21-22 Aug. 1975.

Sponsor(s): Soc. Photo-Optical Instrumentation Engrs; US Army Electronics Command; et al.

Source

Proceedings of the Society of Photo-Optical Instrumentation Engineers, vol.66. Efficient Transmission of Pictorial Information, 1975, p. 172-80, 11 refs, pp. x+230. Publisher: Soc. Photo-Optical Instrumentation Engrs, Palos Verdes Estates, CA, USA.

Author(s)

Roose-J-A, Robinson-G-S. Editor(s): Tescher-A-G.

Author affiliation

Roose, J.A., Naval Undersea Center, San Diego, CA, USA.

Abstract

Interframe coding of television images encompasses techniques which make use of the correlations between pixel amplitudes in successive frames. Intraframe coding techniques that exploit spatial correlations can, in principle, be extended to include correlations in the temporal domain. In this paper, successive frames of digital images are coded using two-dimensional spatial transforms combined with **DPCM** in the temporal domain. Specific transform techniques investigated are the two-dimensional cosine and Fourier transforms. Hardware implementation of the Fourier transform involves manipulation of complex numbers where the cosine transform does not. However, the Fourier transform is attractive because frame-to-frame motion compensation can be introduced directly in the phase plane by application of appropriate phase correction factors. Results are presented in terms of coding efficiency, storage requirements, computational complexity, and sensitivity to channel **noise**.

Descriptors

ENCODING; PICTURE-PROCESSING; VIDEO-SIGNALS.

Classification codes

B6120B Codes*;

B6140C Optical-information-image-and-video-signal-processing;

B6430 Television-equipment-systems-and-applications;

C1250 Pattern-recognition*.

Keywords

temporal-coding; digital-image-sequences; spatial-correlations; spatial-transforms; **DPCM**; Fourier-transforms; two-dimensional-cosine-transforms.

Treatment codes

T Theoretical-or-mathematical.

Language

English.

Publication type

Conference-paper.

Publication year

1975.

Publication date

19750000.

Edition

1976008.

Copyright statement

Copyright 1976 IEE.

Video transmission network with intraframe DPCM and optional interframe coding.

Accession number & update

0000473277 20070101.

Conference information

Proceedings of the IEEE 1972 International Conference on Communications, Philadelphia, PA, USA, 19–21 June 1972.
Sponsor(s): IEEE.

Source

Proceedings of the IEEE 1972 International Conference on Communications, 1972, p. 39–1/6 pp., 12 refs, pp. xviii+1154. Publisher: IEEE, New York, NY, USA.

Author(s)

Thoma–W. Editor(s): Salati–O–M, Weinrich–A–W.

Author affiliation

Thoma, W., Siemens AG, Munich, West Germany.

Abstract

The author discusses an intraframe **DPCM** videophone transmission network in whose high–cost circuit paths (e.g. long–haul lines) the bit rate can be optionally furthermore reduced by **interframe** codecs. The **interframe** codecs operate remotely from the intraframe **DPCM** codecs and do not add further quantizing **noise** to the video signal. The most important source coding problems for such a system are investigated. It is found that in a videophone network a frame memory should be used for repeating and not predicting picture elements. A new predicting algorithm for intraframe **DPCM** codecs is presented which makes use of horizontal and vertical picture correlations, leads to finite error propagation after transmission errors, and allows further bit rate reduction by frame repeating. Experiments have shown the resulting number of bits per picture element after **interframe** coding to be about 1.5 without use of buffer memories and adaptive means.

Descriptors

CODES; INTERFERENCE; MODULATION; TELEPHONE–SYSTEMS.

Classification codes

B6210D Telephony*;
B6430J Applications–of–television–systems.

Keywords

videophone–transmission–network; **optional**–interframe–coding;
differential–pulse–code–modulation.

Treatment codes

P Practical.

Language

English.

Publication type

Conference–paper.

Publication year

1972.

Publication date

19720000.

Edition

1973001.

Copyright statement

Copyright 1973 IEE.

Search Strategy

No.	Database	Search term	Info added since	Results
1	INZZ	compression	unrestricted	113968
2	INZZ	noise	unrestricted	337557
3	INZZ	threshold OR limit	unrestricted	392481
4	INZZ	difference OR subtract OR subtraction	unrestricted	295342
5	INZZ	1 AND 2 AND 3 AND 4	unrestricted	22
6	INZZ	interframe	unrestricted	1542
7	INZZ	dpcm	unrestricted	1691
8	INZZ	6 AND 7	unrestricted	102
9	INZZ	lossy OR irreversible	unrestricted	33524
10	INZZ	8 AND 9	unrestricted	1
11	INZZ	8 AND 2	unrestricted	14
12	INZZ	8 AND 3	unrestricted	2
13	INZZ	8 AND (2 OR 3)	unrestricted	15

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